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Section 1. Amendments to the Claims

CLAIMS

What is claimed is:

Claim 1. (Currently amended): An ultrasonic transducer assembly comprising:

a housing:

an ultrasonic transducer disposed within an interior of the housing and having an active surface directed away from the housing interior;

a transformer;

at least one capacitor; and

an acoustic block disposed in proximity to the active surface of the ultrasonic transducer;

wherein the ultrasonic transducer and the acoustic block have respective acoustic impedance characteristics that mitigate acoustic losses between the transducer and an aluminum watercraft hull.

2. (Currently amended): The ultrasonic transducer assembly of claim 1, further comprising a transformer disposed within ~~the~~ an interior of the housing and having a first winding for being coupled to a circuit external to the housing, and a second winding coupled to the ultrasonic transducer.

3. (Currently amended): The ultrasonic transducer assembly of claim 2, further comprising a capacitor within ~~the~~ an interior of the housing and coupled in parallel to the second transformer winding.

4. (Original): The ultrasonic transducer assembly of claim 1, wherein the transformer steps up voltage to the ultrasonic transducer.

5. {Original} The ultrasonic transducer assembly of claim 1, further comprising: a first adhesive layer disposed between the acoustic block and the active surface of the ultrasonic transducer; wherein the first adhesive layer, the ultrasonic transducer, and the acoustic block have respective acoustic impedance characteristics that mitigate acoustic losses between the transducer and the aluminum hull.

6. {Original} The ultrasonic transducer assembly of claim 1, wherein the acoustic block comprises beryllium.

7. {Original} The ultrasonic transducer assembly of claim 1, wherein the acoustic block comprises a laminated plastic.

8. {Original} The ultrasonic transducer assembly of claim 7, wherein the laminated plastic comprises a phenolic.

9. {Original} The ultrasonic transducer assembly of claim 8, wherein the phenolic is of a thickness in the range of about 0.012 inches to about 0.036 inches.

10. {Original} The ultrasonic transducer assembly of claim 1, further comprising a wrapping effectively enclosing the ultrasonic transducer except for the active surface.

11. {Original} The ultrasonic transducer assembly of claim 10, wherein the wrapping comprises cork.

12. {Original} The ultrasonic transducer assembly of claim 3: wherein the interior of the housing is filled with an epoxy; and wherein the transformer, the capacitor, and the ultrasonic transducer are disposed in the epoxy within the interior of the housing.

13. {Original} The ultrasonic transducer assembly of claim 12 further comprising micro-balloons disposed in the epoxy.

14. {Original} The ultrasonic transducer assembly of claim 1, wherein the transducer is a ceramic piezoelectric transducer.

15. {Original} The ultrasonic transducer assembly of claim 1 further comprising: an electrical conductor passing through the housing from the interior thereof for coupling to an external sounding unit; and a resonant circuit disposed in the housing interior and electrically coupled between the electrical conductor and the ultrasonic transducer.

16. {Original} The ultrasonic transducer assembly of claim 1 further comprising: an electrical impedance matching circuit disposed in the housing interior and electrically coupled between the electrical conductor and the ultrasonic transducer.

17. {Original} The ultrasonic transducer assembly of claim 1 further comprising: an electrical conductor passing through the housing from the interior thereof for coupling to an external sounding unit; and a resonant impedance matching circuit disposed in the housing interior and electrically coupled between the electrical conductor and the ultrasonic transducer.

18. {Original} An ultrasonic transducer assembly for mounting on an interior surface of an aluminum-hulled boat, comprising: a housing; an ultrasonic transducer disposed within an interior of the housing and having an active surface directed away from the housing interior; an inductor disposed within the housing interior; and a capacitor disposed within the housing interior; wherein the inductor and the capacitor are coupled to form a resonant circuit and are coupled to the ultrasonic transducer.

19. {Original} The ultrasonic transducer assembly of claim 18: further comprising a step-up transformer having a primary winding and a secondary winding, the inductor being the secondary winding; wherein the ultrasonic transducer is a ceramic piezoelectric transducer.

20. {Original} The ultrasonic transducer assembly of claim 18, further comprising: an acoustic block disposed in proximity to the active surface of the ultrasonic transducer; and an adhesive layer disposed between the acoustic block and the active surface of the ultrasonic transducer; wherein the ultrasonic transducer, the acoustic block, and the adhesive layer have respective acoustic impedance characteristics that mitigate acoustic losses between the ultrasonic transducer and an aluminum watercraft hull coated with an additional adhesive layer for adhering the ultrasonic transducer assembly to the aluminum watercraft hull.

21. {Original} An ultrasonic transducer assembly for mounting on an interior surface of an aluminum-hulled boat, comprising: a housing; an ultrasonic transducer disposed within an interior of the housing and having an active surface directed away from the housing interior; and a transformer disposed within the interior of the housing and having a first winding for being coupled to a sounding unit external to the housing, and a second winding coupled to the ultrasonic transducer.

22. {Original} The ultrasonic transducer assembly of claim 21: further comprising a capacitor disposed within the housing interior; wherein the second winding of the transformer and the capacitor are coupled to form a resonant circuit and are further coupled to the ultrasonic transducer.

23. {Original} The ultrasonic transducer assembly of claim 22 wherein: the transformer is a step-up transformer, the first winding being a primary winding and the second winding being a secondary winding; and wherein the ultrasonic transducer is a ceramic piezoelectric transducer.

24. {Original} The ultrasonic transducer assembly of claim 21, further comprising: an acoustic block disposed in proximity to the active surface of the ultrasonic transducer; and an adhesive layer disposed between the acoustic block and the active surface of the ultrasonic transducer; wherein the ultrasonic transducer, the acoustic block, and the adhesive layer have respective acoustic impedance characteristics that mitigate acoustic losses between the

ultrasonic transducer and an aluminum watercraft hull coated with an additional adhesive layer for adhering the ultrasonic transducer assembly to the aluminum watercraft hull.

25. {Original} A manufacture for use in a watercraft, comprising: an aluminum watercraft hull having an interior surface; a transducer assembly comprising: a housing; an ultrasonic transducer disposed within an interior of the housing and having an active surface directed away from the housing interior; a transformer disposed within the interior of the housing and having a first winding for being coupled to a sounding unit external to the housing, and a second winding coupled to the ultrasonic transducer; a capacitor disposed within the interior of housing and coupled to the second winding, the capacitor and the second winding forming a resonant circuit; an acoustic block disposed in proximity to the active surface of the ultrasonic transducer; and a first adhesive layer disposed between a first surface of the acoustic block and the active surface of the ultrasonic transducer; and a second adhesive layer disposed between a second surface of the acoustic block and the interior surface of the aluminum hull; wherein the ultrasonic transducer, the first adhesive layer, the acoustic block, and the second adhesive layer have respective acoustic impedance characteristics that mitigate acoustic losses between the transducer and the aluminum watercraft hull.

26. {Original} The manufacture of claim 25, wherein the first adhesive layer is identical to the second adhesive layer.

27. {Original} The manufacture of claim 25, wherein the first adhesive layer is different than the second adhesive layer.

28. {Withdrawn} A method to detect an object in a body of water beneath an aluminum-hulled watercraft using a sounding unit, comprising: generating a first voltage pulse at a selected frequency at the sounding unit; supplying the first voltage pulse to a sealed ultrasonic transducer assembly; stepping up the first voltage pulse to a second voltage pulse in the transducer assembly; supplying the second voltage pulse to an ultrasonic transducer in the transducer assembly to generate an ultrasonic acoustic signal; and transmitting the

ultrasonic acoustic signal into the body of water through an impedance-matching acoustic block and through the aluminum hull.

29. {Withdrawn} The method of claim 28, further comprising: generating a third voltage pulse at the ultrasonic transducer from the reflection of the ultrasonic acoustic signal from the object; applying the third voltage pulse from the ultrasonic transducer to a resonant circuit in the transducer assembly to obtain a fourth voltage from which frequencies other than the selected frequency are rejected; and furnishing the fourth voltage to the sounding unit.

30. {Withdrawn} The method of claim 29 wherein the selected frequency is in a range of about 28 KHz to about 455 KHz.

31. {Withdrawn} The method of claim 30 wherein the selected frequency is in a range of 50 KHz to 200 KHz.

32. {Withdrawn} A method of manufacturing an aluminum hull for use in a watercraft, comprising: providing a sealed transducer assembly comprising an ultrasonic transducer with an active surface; attaching the transducer assembly to an acoustic block with a first layer of adhesive disposed between the active surface and a first surface of the acoustic block; and attaching a second surface of the acoustic block to the aluminum hull with a second layer of adhesive disposed between the second surface of the acoustic block and the aluminum hull.

33. {Withdrawn} The method of claim 32 wherein the sealed transducer assembly further comprises: a voltage step-up functionality for transmitting an ultrasonic acoustic signal of a predetermined frequency; and a frequency rejection functionality for rejecting signals in a received acoustic signal other than the predetermined frequency.